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# THE FGE MAGNETOMETER AND THE INTERMAGNET 1 SECOND STANDARD

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During the last 2 years, the Danish Space Center, DTU Space, has tested and made new features to the well known FGE 3-axis Fluxgate Magnetometer. Due to the new INTERMAGNET standard for 1 second data, we have tested the magnetometer to prove that it fulfills the demands. We will show that the instrument can have a very good linear frequency response up to 20 Hz, depending on the used lowpass filter and gain. Also the delay in the signal is well defined and can be taken into account in the datalogger system, not only in new FGE systems but in most FGE systems placed in observatories round the world.
The noise of the used fluxgate sensors seems to be the only point that can not recently fulfull the new standard, but we will show how close the noise is to the specificed limit.

During the tests we have used a suitable digital filter that fulfills the new demands for the frequency response: the filter is linear from DC to 0.2 Hz and has at least of 60 dB attentuation at 0.5 Hz and above. With the MagRec-4B and ObsDaq ADC data acqusition system, operating with 128 Hz sampling rate and GPS time synchronization, the time stamp accuracy can be better than 0.01 sec.
We have also developed a new electronic board for differential output of the three components X, Y and Z, and with this board it is possible to upgrade older FGE systems to use fast seismic dataloggers or similar instruments (like Magrec-4B/ObsDaq datalogger system) in parallel with old datalogger systems. So after such an upgrade the observatory's original FGE magnetic data supporting very good baseline stability can still be acquired together with new data, supporting better noise characteristics, frequency response and timing accuracy.
We will also show how the INTERMAGNET Square Wave System can be used to test the frequency response and to find the delay in the whole system, from sensor to data acqusition system.

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